Standard Operating Procedure

**Lithium Aluminum Hydride**

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and
3) SOP has been signed and dated by the PI and relevant lab personnel.*

 Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** [ ]  Process [x] Hazardous Chemical [x]  Hazardous Class

**Purpose**

Lithium aluminum hydride is a highly water reactive chemical. It reacts violently with water and/or moisture to give hydrogen gas with possible ignition. It is widely used as a reducing agent to reduce esters and carboxylic acids to primary alcohols.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 16853-85-3

Class: **Water reactive, Toxic, Corrosive**

Molecular Formula: LiAlH4

Form (physical state): Powdered solid

Color: White to grey

Boiling point: N/A

Synonyms: lithium aluminum hydride; lithium aluminum tetrahydride; lithium aluminium tetrahydride; lithium tetrahydroaluminate; aluminate, tetrahydro-, lithium; lithium aluminohydride; aluminum lithium hydride; lithium alanate; LAH

**Potential Hazards/Toxicity**

LD50 Oral - mouse - 85 mg/kg

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (corrosive), of eye contact (corrosive). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe overexposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Reacts violently with water liberating extremely flammable hydrogen gas

**Personal Protective Equipment (PPE)**

**Respirator Protection**

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Handle with nitrile/neoprene gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with Lithium Aluminum Hydride. Wash with warm water and soap, dry hands.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with Lithium Aluminum Hydride.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI approved safety glasses.

**Skin and Body Protection**

Fire/flame resistant lab coat (100% cotton based)

Fully cotton based clothing/attire.

Full length pants or equivalent

Close toed shoes

**Hygiene Measures**

Avoid contact with skin, eyes and clothing.

Wash hands before breaks and immediately after handling Lithium Aluminum Hydride.

**Engineering Controls**

To be always handled inside a certified fume hood in the lab with proper PPE. **\***Use nitrogen gas to purge. *NOTE*: Inside the fume hood, please keep away oxidizing agents, acids, moisture/water from Lithium Aluminum Hydride.

**First Aid Procedures**

**If inhaled**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

**In case of skin contact**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**In case of eye contact**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

**If swallowed**

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

**Special Handling and Storage Requirements**

**Precautions for safe handling:**

* Keep container dry.
* Keep away from heat.
* Keep away from sources of ignition.
* Ground all equipment containing material.
* Do not ingest.
* Do not breathe dust.
* Never add water to this product.
* In case of insufficient ventilation, wear suitable respiratory equipment. (NOTE: Please refer to PPE section of this SOP).
* If ingested, seek medical advice immediately and show the container or the label.
* Avoid contact with skin and eyes.
* Keep away from incompatibles such as oxidizing agents, acids, moisture.

**Conditions for safe storage:**

* Keep container tightly closed.
* Keep container in a cool, well-ventilated area.
* Keep from any possible contact with water.
* Do not allow water to get into container because of violent reaction.

**Conditions of Instability:** Water, oxidizing agents, acids, heat & friction.

**Incompatibility with various substances:**

Reactive with oxidizing agents, alcohols, acids, moisture, Carboxylic acid, Peroxides, Chlorinated solvents & Halogens. The product reacts violently with water to emit flammable (H2) but non-toxic gases.

**Corrosivity:** Non-corrosive to glass.

**Special Remarks on Reactivity:**

Lithium Aluminum Hydride is a strong reducing agent and water reactive substance. Incompatible with air (carbon dioxide), carbon + sodium bicarbonate at high temp., strong oxidizing agents, acids, alcohols, benzoyl peroxide, born trifluoride etherate, (2-Chloromethylfuran + Ethyl acetate), diethylene glycol dimethyl ether, Diethyl ether, 1,2-dimethoxyethane, Dimethyl ether, Methyl Ethyl Ether, (Nitriles + water), Perfluorosuccinamide, Perfluorosuccinamide + water, Tetrahydrofuran,

perchlorates, carboxylic acids, sugars, oxygen, peroxides, chlorinated solvents, and halogens. Reacts violently with water. On contact with water, it forms a corrosive substance: Lithium hydroxide.

**Materials to avoid**

Carboxylic acid, Peroxides, Chlorinated solvents, Halogens, alcohols, water

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Wearing proper PPE, decontaminate equipment and bench tops using soap and water.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with Lithium Aluminum Hydride, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

|  |  |  |
| --- | --- | --- |
| **Name** | **Signature** | **Date** |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |
| Click here to enter text. |  | Click here to enter a date. |